

# Spring 2009 Climate Summary For Southwest Lower Michigan

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The 2009 spring season over Southwest Lower Michigan featured near normal temperatures, above normal precipitation, and well below normal snowfall. It was an unusual spring due to the infrequency of severe thunderstorm episode days and days with highs warmer than 80 degrees.

While it was snowy most of the winter of 2008/2009, snowfalls became infrequent after mid February. There were only two significant snowfalls during the spring of 2009. The first snowfall impacted areas north of Route 10 from the afternoon of March 8<sup>th</sup> until the early morning of the 9<sup>th</sup>. Snowfall amounts ranged from 2 to 4 inches. The second and final snowstorm of the season occurred on the 6<sup>th</sup> of April, when 4 to 7 inches fell south and east of a line from Lansing to Battle Creek.

The severe weather season was unusually quiet even through it was a wet spring. There was only one episode of severe storms during the entire spring in Southwest Lower Michigan. That episode occurred from the late morning into the early afternoon of April 25<sup>th</sup>, when wind damage affected areas south and east of Grand Rapids.

TABLE 1. Reported temperature, precipitation and snowfall amounts for the spring of 2009 at selected climate stations in Southwest Lower Michigan. Normals are computed from 30-year averages from 1971-2000.

Location		Temperature (F)	Precipitation (inches)	Snowfall (inches)
Grand Rapids	<i>Reported</i>	47.7°	10.87	0.4
	<i>Normal</i>	46.3°	9.42	11.8
	<i>Departure</i>	+1.4°	+1.45	-11.4
Lansing	<i>Reported</i>	46.8°	13.65	6.0
	<i>Normal</i>	45.5°	8.13	11.2
	<i>Departure</i>	+1.3°	+5.52	-5.2
Muskegon	<i>Reported</i>	46.1°	9.46	0.4
	<i>Normal</i>	45.0°	8.22	14.2
	<i>Departure</i>	+1.1°	+1.24	-13.8

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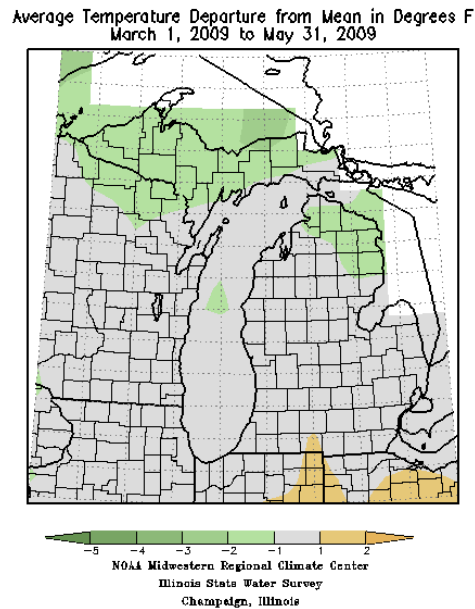


Figure. 1. Spring 2009 daily mean temperature departure from normal for Michigan.

The spring mean temperature across the area was 46.0°F, which was 0.8°F warmer than the 1971 to 2000 normal (Figure 1). In comparison, the spring of 2008 was 0.8°F colder than normal over Southwest Lower Michigan. The NCDC state ranking map (Figure 2) shows Michigan was near normal in temperature for the spring of 2009, as the state experienced the 68<sup>th</sup> coolest out of 115 total springs (going back to 1895). Near normal temperatures dominated the weather over the northern Midwest and Great Lakes.

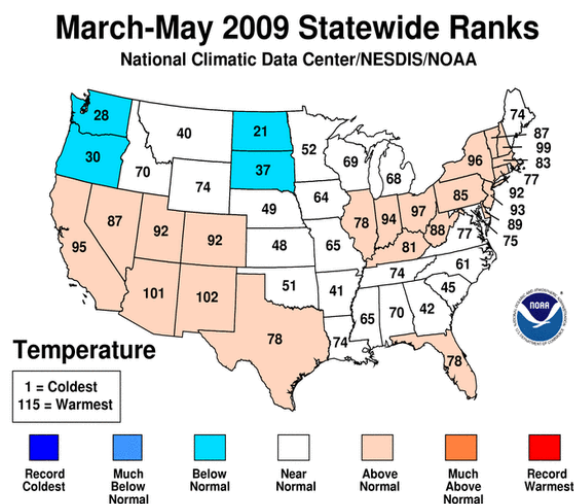


Figure 2. Spring 2009 NCDC temperature ranking for the contiguous United States.

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Looking at all the springs from 1950 through 2009 for all of Southwest Lower Michigan and using the 36 long-term climate stations, there is a recent trend toward warmer springs (Figure 3). Six of the past ten springs were warmer than normal, which contrasts the predominantly cooler than normal springs from 1950 through 1984. The official 10-year temperature trend shows warming over much of the Great Lakes (Figure 4).

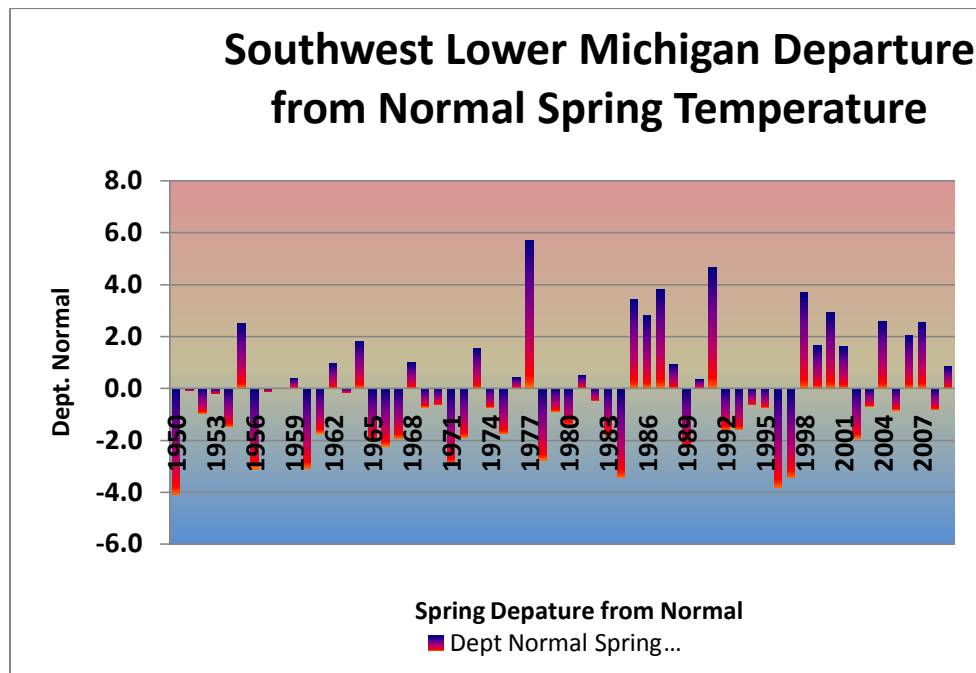


Figure 3. Spring mean area temperature departure from normal for all of Southwest Lower Michigan long-term climate stations from 1950 through 2009.

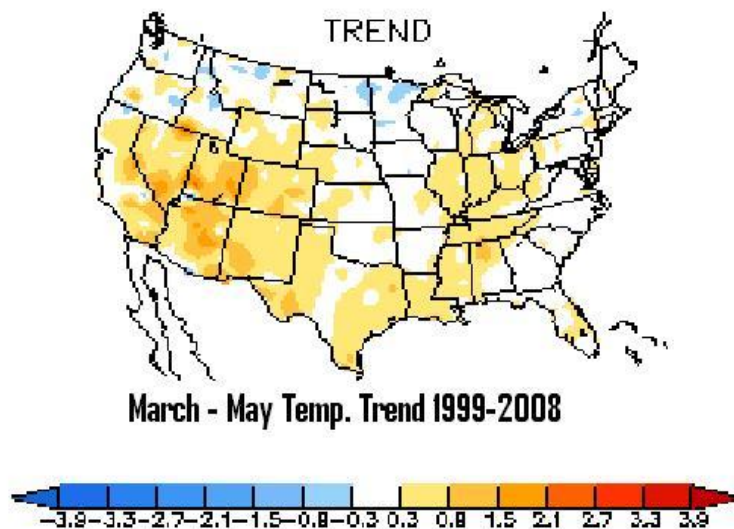


Figure 4. Temperature trend from March through May. The trend here is the mean temperature over the past ten years (1999-2008) minus the 1971-2000 mean.

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For the most part, daily temperatures were above normal (Figures. 6-8). March was the warmest month relative to normal and the only spring month that was in the top one third warmest category. April and May were closer to normal. There were very few days with highs in the 80s. At Grand Rapids, there are normally seven days with highs of 80 degrees or warmer. This year, there were only three days during the entire spring. Lansing saw only three such days and Muskegon saw none, compared to their respective normals of seven and three days.

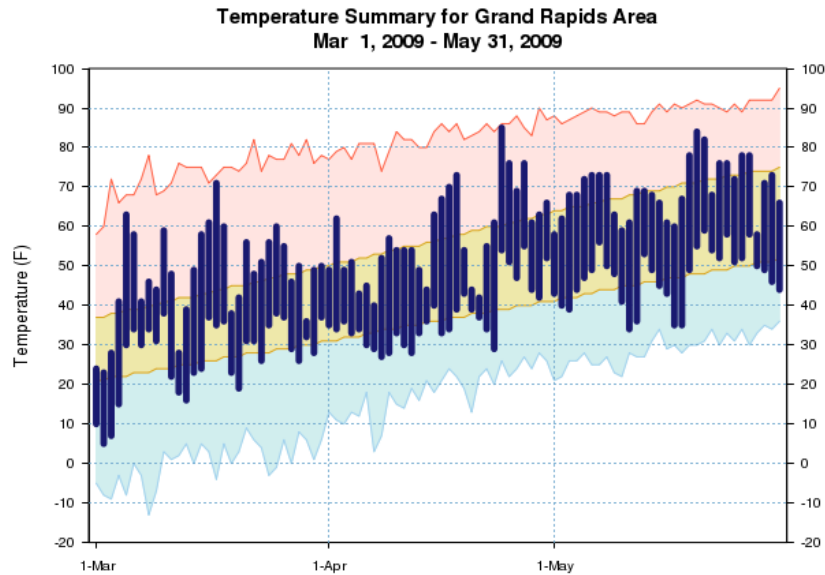


Figure 5. Spring 2009 daily temperatures for Grand Rapids. The daily maximum and minimum temperatures are connected by dark blue bars. Area between the maximum and minimum temperature has tan shading. Red lines connect the record high temperatures. Blue lines connect the record low temperatures.

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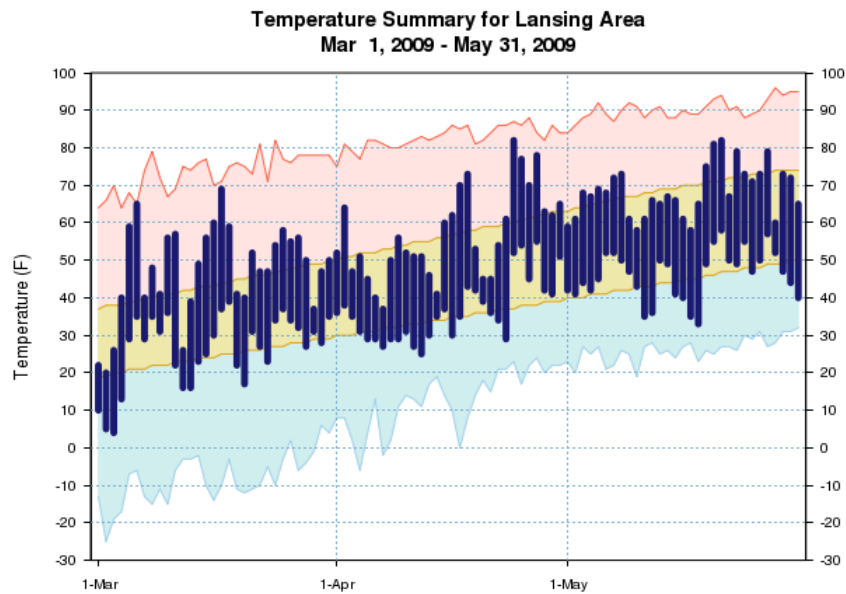


Figure 6. Same as Figure 5, except for Lansing.

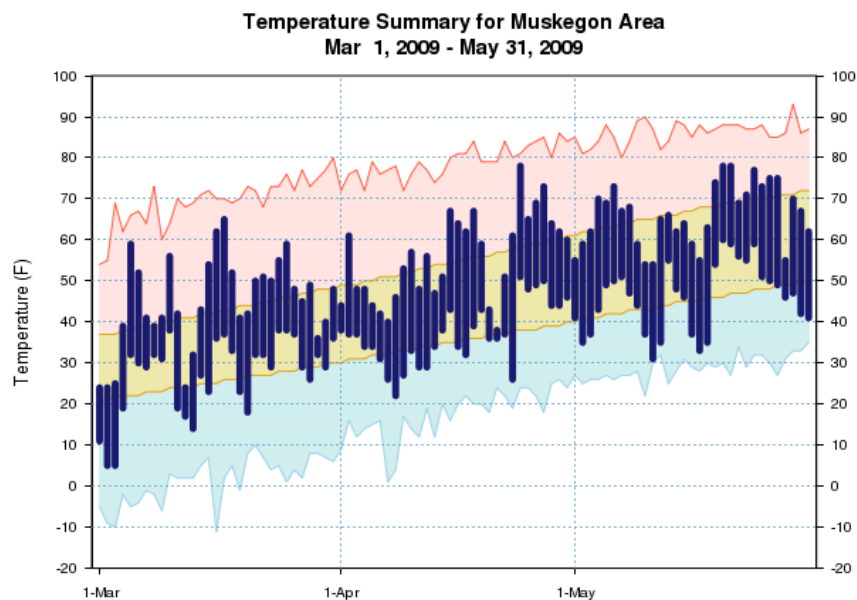


Figure 7. Same as Figure 5, except for Muskegon.

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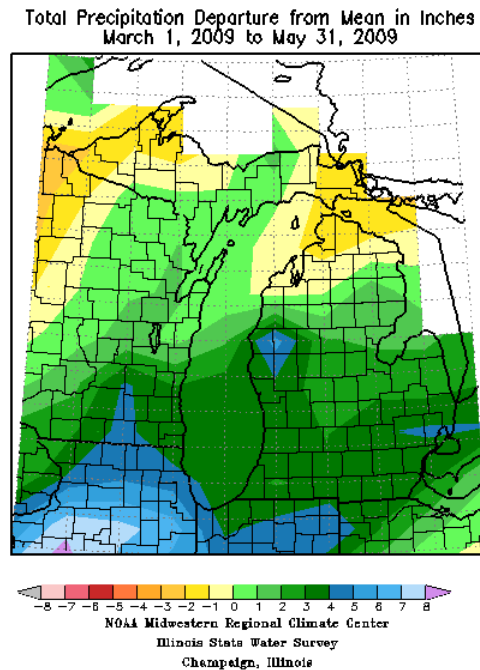


Figure 8. Spring 2009 total precipitation departure from normal.

Precipitation generally was two to four inches above normal (Figure 8). Some locations in west central Lower Michigan were over seven inches above normal. Muskegon's 13.42 inches of precipitation was their all-time wettest spring since records began in 1898. Grand Rapids had the third wettest spring on record with 11.32 inches of precipitation. Area wide, the spring of 2009 was the 5<sup>th</sup> consecutive spring with wetter than normal conditions (Figure 9). During the period of record (1895 to 2009), the only other times five consecutive wet springs occurred in Southwest Lower Michigan were in the mid 1960s and the early to mid 1970s. There never has been a recorded instance of six consecutive wet springs. The wet weather covered most of the northern Midwest and Great Lakes (Figure10).

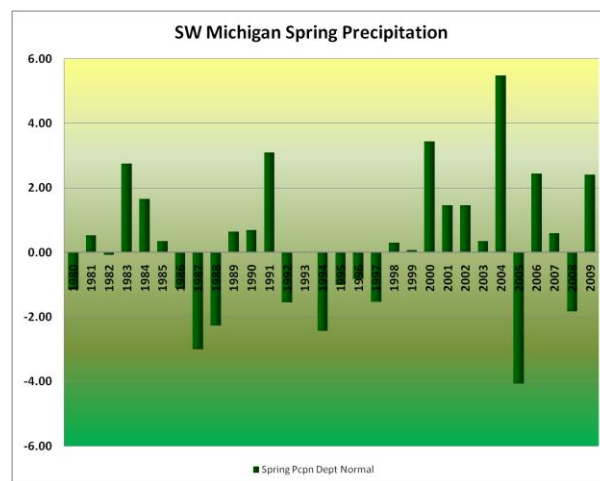


Figure 9. Total spring precipitation departure from normal for all of Southwest Lower Michigan.

# Spring 2009 Climate Summary For Southwest Lower Michigan

The NCDC state ranking map for the spring of 2009 shows Michigan as having the 29<sup>th</sup> wettest spring on record (Figure 10). Given all of the rainfall and runoff from the melting snows, the national stream flow map on March 11<sup>th</sup> shows most of the streams in southern Michigan at record or near record levels and also reveals how wet conditions were at the start of the spring (Figure 11). The stream flows at Ionia on the Grand River (Figure 12) and at Comstock on the Kalamazoo River (Figure 13) show above normal stream flow continued through the spring.

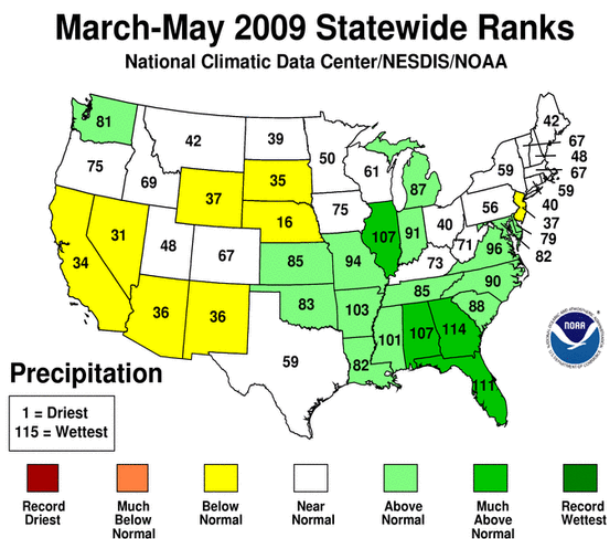


Figure 10. The NCDC spring precipitation ranking for the contiguous United States

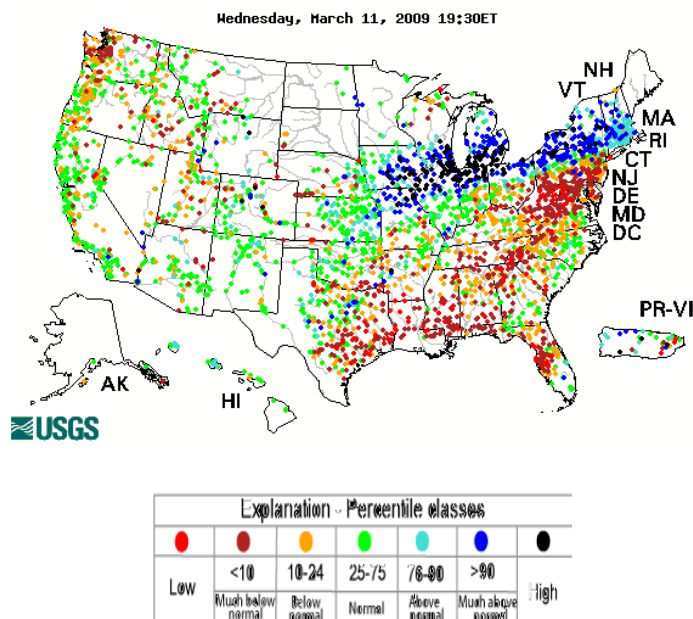


Figure 11. Steam flow percentage of normal on March 11<sup>th</sup>, 2009.

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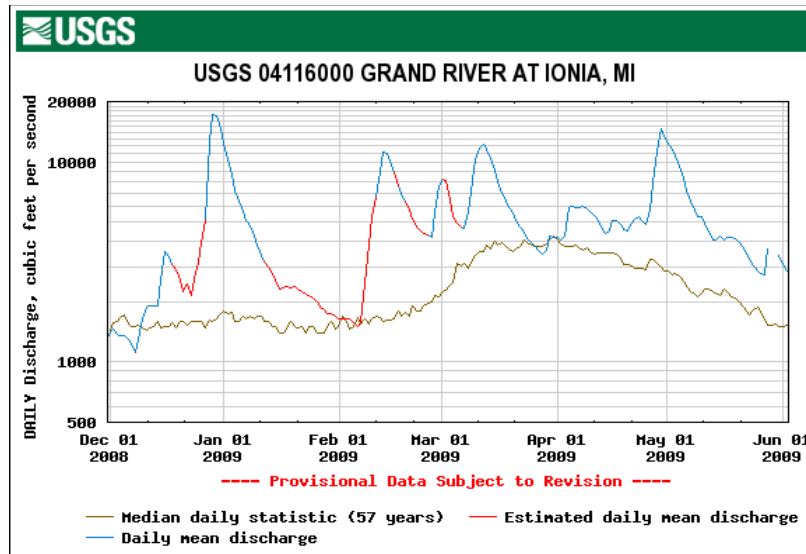


Figure 12. The stream flows for the Grand River at Ionia, Dec. 2008 through Jun 2009.

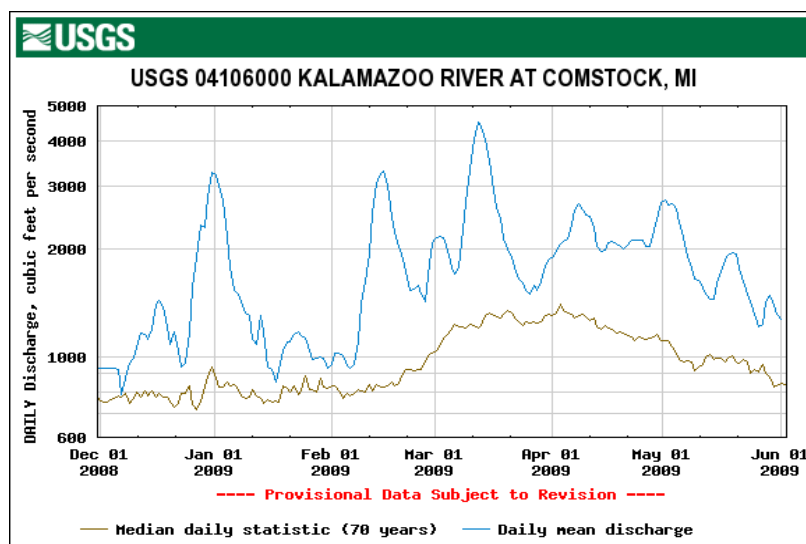


Figure 13. The stream flows for the Kalamazoo River at Comstock, Dec. 2008 through Jun 2009.



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The daily rainfall graphs below show the daily rainfall as an accumulated value through the spring. The daily accumulated rainfall is shown for Grand Rapids (Figure 14), Lansing (Figure 15), and Muskegon (Figure 16). Rainfall for the spring was heaviest in late April. This can be seen at all three climate sites on the graphs where the sharpest rises occurred.

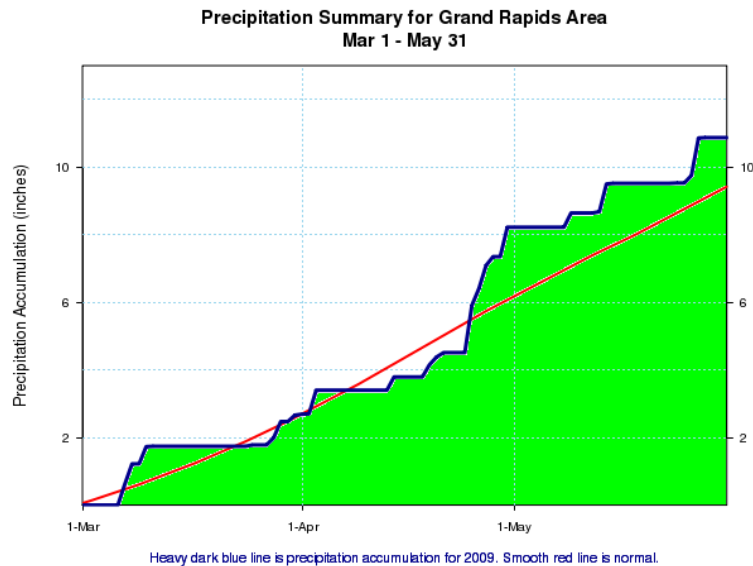


Figure 14 . Grand Rapids daily precipitation accumulation for the spring of 2009.

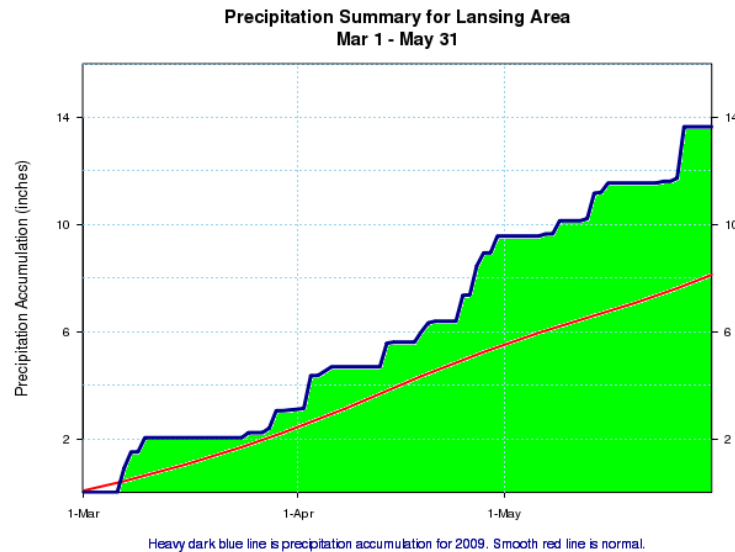


Figure 15. Lansing daily precipitation accumulation for the spring of 2009.

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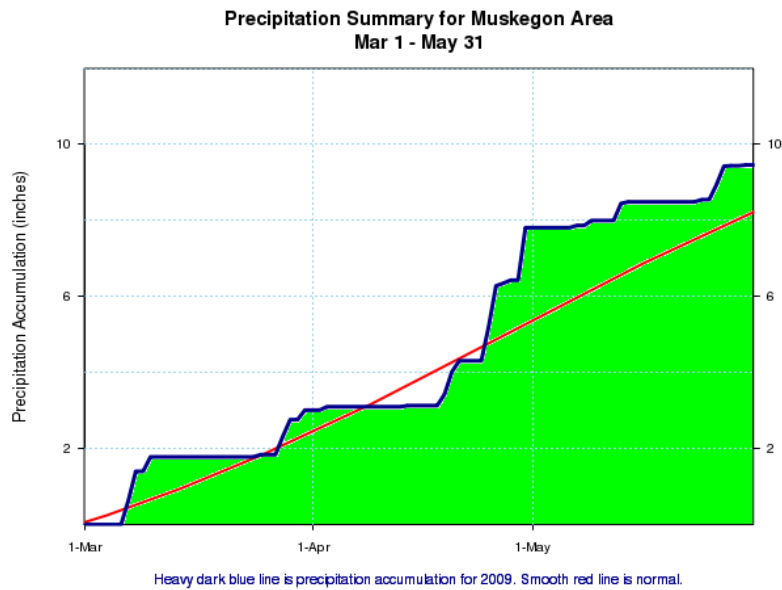


Figure 15. Muskegon daily precipitation accumulation for the spring of 2009.

The only severe weather episode of the spring occurred on April 25<sup>th</sup>. This was below the average of three severe weather episodes per season from 2001 through 2009 (Figure 17). Other recent springs with only one severe thunderstorm episode occurred in 2001, 2002, and 2007. The last spring with no severe thunderstorm episodes in Southwest Lower Michigan occurred in 1992.

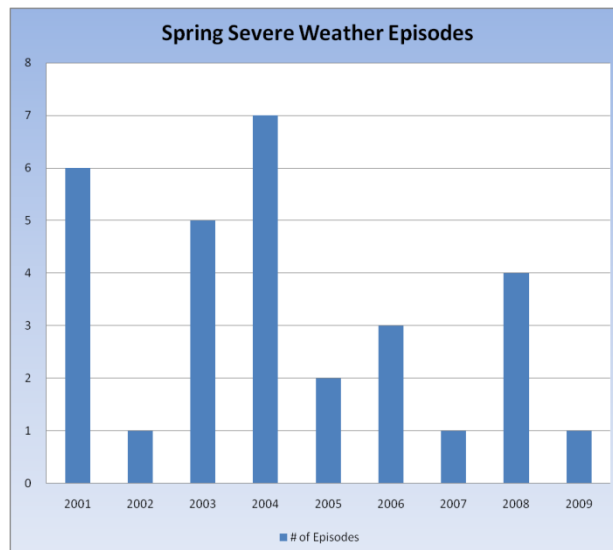


Figure 16. Severe Storm Episodes for Southwest Lower Michigan

It may seem odd to have above normal rainfall yet so few severe thunderstorm episodes. Yet this was also the case in 2002. Conversely, the spring of 2008 saw four severe weather episodes but was much drier than normal.

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Snowfall this past spring was below normal across Southwest Lower Michigan (Figure 18). Snowfall was nearly a foot below normal from near Holland, north to Muskegon and west of US-31. Areas east of US-131 had snowfall deficits closer to six inches. The snow storm on April 6<sup>th</sup> helped to reduce the anomaly south and east of a line from Lansing to Battle Creek.

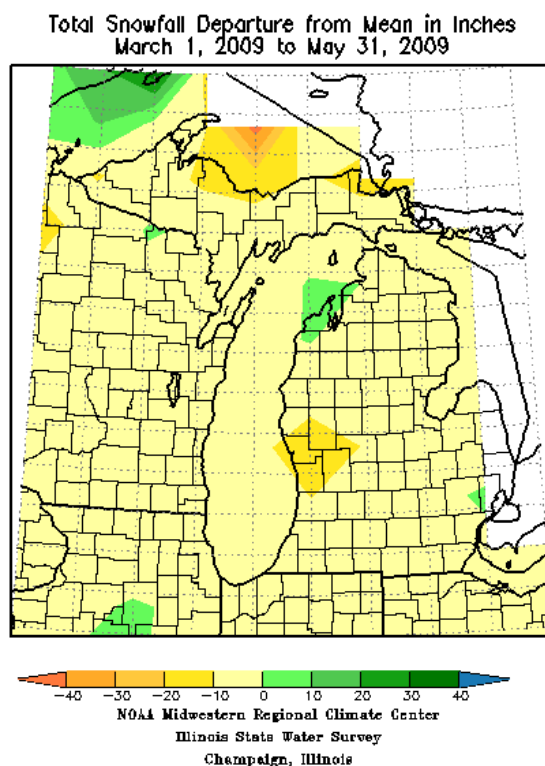


Figure 18. The spring 2009 seasonal snowfall departure from normal.

With most of the snow falling in the March 8<sup>th</sup> and April 6<sup>th</sup> storms, the spring snowfall map shows two areas of heavier snowfall, areas near and north of Route 10 and areas south and east of a line from Lansing to Battle Creek (Figure 19). Areas south of Interstate 96 and west of Lansing generally had less than two inches of snowfall.

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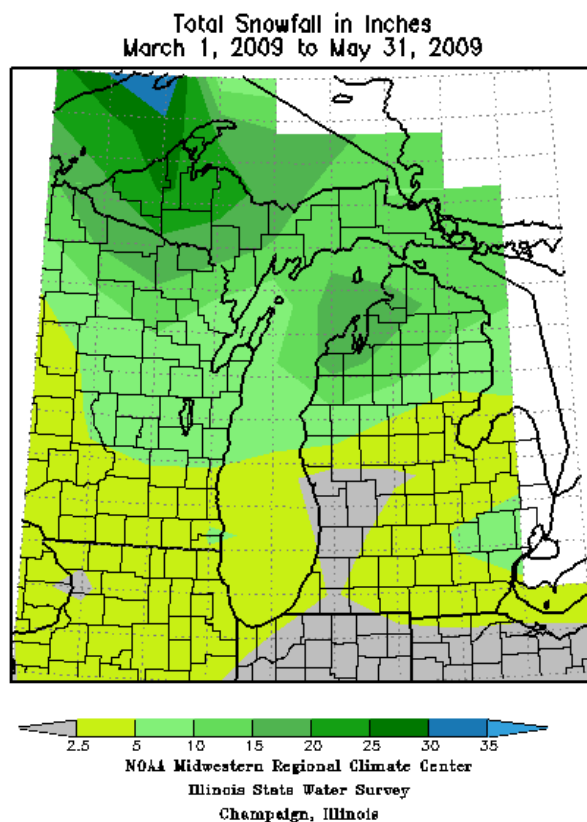


Figure 7. The spring 2009 seasonal snowfall total for Michigan.

For more details on the individual snow events and rainfall events see the monthly weather summaries listed below:

**March 2008 Climate Summary:** <http://www.crh.noaa.gov/images/grr/climate/CS200903.pdf>

**April 2009 Climate Summary:** <http://www.crh.noaa.gov/images/grr/climate/CS200904.pdf>

**May 2009 Climate Summary:** <http://www.crh.noaa.gov/images/grr/climate/CS200905.pdf>